Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03512, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03512
EGU General Assembly 2008

Oceanic circulation and climate in the latest Messinian (5.7-5.3 Ma)

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We use a pluri-proxy approach; quantitative planktonic foraminifera fauna counts, preservation aspect, geochemistry on foraminifera tests (Mg/Ca and stable isotopes), as well lithics counts to study two open marine sites during the latest Messinian. We study Leg 177 ODP 1088 taken from the Eastern South Atlantic and Leg 154 ODP Site 925 in the Western Tropical North Atlantic. Both sedimentary records cover the interval 5.7-5.3 Ma, which encompasses the time of deposition of the upper evaporites in the Mediterranean basin. We concur with existing observations about the Messinian Salinity Crisis about placing a major oceanographic and climatologic event into the Messinian at the termination from the glacial (TG12) to the distinctively prominent TG11 warm Interglacial circa 5.5 Ma and not at the onset of the Pliocene. At Site 925 in the tropical Atlantic we observe a progressive warming of about 2ºC, throughout the studied interval together with cyclic variations of maximum amplitude between 5.55-5.33 Ma in relation to the ITCZ variability over the site. At Site 1088 in the south Atlantic we have reconstructed a large warming of about 3ºC at 5.5 Ma, this happens early in the transition from TG12 to TG11. This intense warming could have been promoted by seaways configuration at the time (Bering and Indonesian sea way) giving rise to an extreme Enso like situation in the pacific and local warming of the Atlantic Aghulas area. In agreement with observation today near Antarctica this would have decreased the sea ice cover in the pacific sector along the West Antarctic Ice sheet. Such a decrease was observed through Mass Accumulation Rate in the Bellinghausen Sea at the end of the Messinian. At the onset of the Pliocene circa 5.33 Ma large lithics arriving at Site 1088 marked a new deterioration of the climate in the southern Hemisphere and possibly an enhanced Sea ice cover and cooler southern Ocean. This has

to be put in perspective of sedimentological evidence for increased AABW flow at 5.3 observed in the south at Atlantic and low benthic δ13C at Site 925.

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